

PRIVILEGED AND CONFIDENTIAL  
ATTORNEY WORK PRODUCT

COVINGTON & BURLING DRAFT

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**TOBACCO INGREDIENT PYROLYSIS AND TRANSFER CONTRIBUTIONS  
TO CIGARETTE MAINSTREAM SMOKE**

**ABSTRACT**

*// is objective!*

This report summarizes information about tobacco leaf composition and the contribution of tobacco leaf components to the composition of mainstream cigarette smoke, compares cigarette additive composition with tobacco leaf composition, and describes the relationships between cigarette additives and cigarette mainstream smoke composition.

A significant amount of research on the composition of tobacco leaf, tobacco smoke and the contribution of leaf components to cigarette smoke has been conducted over the past 40 years. The research has resulted in the development of a vast amount of information on the contribution of leaf components to cigarette smoke. The information on leaf components can be used to assess the contribution of tobacco additives to mainstream smoke.

Many of the major additives used in cigarettes are identical in composition to naturally occurring tobacco leaf components. Additives <sup>have natural analogs</sup> which are identical to leaf components are sugars, starches, organic acids and their salts, lipids,

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TABLE 3Mainstream Smoke Composition for a Representative  
U.S. Blend Full Taste Filtered CigaretteWhole Smoke% By Weight

N <sub>2</sub>	62 X
O <sub>2</sub>	13
CO <sub>2</sub>	12.5
CO	4
H <sub>2</sub> O*	2
H <sub>2</sub>	1
Particulate phase**	4
Vapor phase***	1.5
	<u>100.0</u>

\* From particulate + vapor phase

\*\* No H<sub>2</sub>O; 17.6 mg tar + 1.4 mg nicotine\*\*\* No H<sub>2</sub>O; less the above gases; 6.8 mg.Particulate and Vapor Phase Compositions

<u>Constituent or Class</u>	<u>mg In Particulate Phase</u>	<u>mg In Vapor Phase</u>	<u>mg Total</u>	<u>Number of Identified Compounds</u>
Hydrocarbons	3.15	3.04	6.19	760
Aldehydes	1.58	1.35	2.93	110
Ketones	0.90	0.81	1.71	520
Nitrogen heterocycles	0.79	0.14	0.93	920
Esters	0.79	0.07	0.86	480
Organic acids	2.93	0.10	3.03	230
Alcohols	1.80	0.14	1.94	380
Nicotine	1.35	---	1.35	1
Phenols	0.79	---	0.79	280
Nitriles	---	0.61	0.61	110
Others	4.84	0.49	5.33	Hundreds
Totals	18.9	6.8	25.7	~3800

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